REMARKS

Claims 1-20, 35, and 40 are pending in the case. Further examination and reconsideration of pending claims 1-20, 35, and 40 are hereby respectfully requested.

Section 102 Rejections:

Claims 20 and 40 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,057,689 to Nomura et al. (hereinafter "Nomura"). As will be set forth in more detail below, the § 102 rejections of claims 20 and 40 are respectfully traversed.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), MPEP § 2131. The cited art does not disclose all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

The cited art does not teach a method for controlling a magnetic field strength of a magnetic lens that includes applying a current to the magnetic lens that is responsive to a control signal, where the control signal is responsive to an output signal that is responsive to a magnetic field strength generated by the magnetic lens. Independent claim 20 recites:

> A method for controlling a magnetic field strength of a magnetic lens, comprising: generating an output signal in response to a first magnetic field strength generated by the magnetic lens; generating an input signal in response to a predetermined magnetic field strength; generating a control signal in response to the output signal and the input signal; and applying a current to the magnetic lens, wherein the current is responsive to the control signal.

Independent claim 40 recites similar limitations.

Nomura discloses a scanning electron microscope and a method of displaying cross sectional profiles using the same. Nomura, however, does not disclose a method for controlling a magnetic field strength of a magnetic lens that includes applying a current to the magnetic lens that is responsive to a control signal, where the control signal is responsive to an output signal that is responsive to a magnetic field strength generated by the magnetic lens. For example, Nomura discloses that an operator performs

astigmatism correction of a magnetic lens at various areas on a wafer and the magnetic field strength of the magnetic lens after the correction is stored as a function of position. In particular, Nomura states:

> astigmatism correction is made by the operator while projecting the electron beam 12 on the center of each area. The astigmatism correction work is performed by adjusting the current to be supplied to the coil 20 and the current to be supplied to the astigmatism correction coil 5 as well as the voltage to be supplied to the stage height control mechanism 40. The magnetic field strength (initial state magnetic field information) under which the astigmatism correction has been done with respect to the center of each area is measured by the magnetic field sensors, and the thus measured value for each area is stored in the memory. (Nomura -- col. 14, lines 8-21.)

Nomura also discloses that the currents supplied to coils of the magnetic lens are responsive to the position of the wafer being examined. For example, Nomura states that "if the current area is different from that before the stage was moved (in the case of N), the process moves to step 118 in which a current is supplied to the astigmatism correction coil 5 and the coil 20, and a voltage to the stage height control mechanism 40, the current and voltage being based on the combination of values stored in the memory with respect to the current area." (Nomura -- col. 14, lines 44-51.) Therefore, Nomura discloses applying a current to a magnetic lens that is responsive to a position of the scanning electron microscope with respect to a wafer. However, Nomura does not disclose applying a current to a magnetic lens that is responsive to a control signal, which is responsive to an output signal that is responsive to a magnetic field strength generated by the magnetic lens.

Furthermore, Nomura discloses controlling the scanning electron microscope in response to a measured magnetic field strength of the magnetic lens, not by altering a current applied to the magnetic lens, but by altering a height and an inclination of a stage of the scanning electron microscope. For example, Nomura states:

> ΔBx is obtained from the magnetic field sensors 1 and 2, and represents the degree of the magnetic field distortion (asymmetry) in the X direction. ΔBy is obtained from the magnetic field sensors 3 and 4, and represents the degree of the magnetic field distortion in the Y direction. In step 127, the height and inclination of the stage are adjusted by means of the stage height control mechanism 40 in such a way as to reduce ΔBx and ΔBy. (Nomura -- col. 15, lines 20-28.)

In another example, Nomura states that "the voltage to be applied to the stage height control motors is adjusted so that the magnetic field strength to be measured becomes equal to the calculated magnetic field strength for the current stage position." (Nomura -- col. 16, lines 10-14.) In a further example, Nomura states:

> After the stage is moved so that the electron beam 12 is projected onto a desired observation portion on the wafer 22, the magnetic field strength Bzi (i = 1, 2, 3, 4) are measured using the magnetic field sensors 1, 2, 3, 4. In step 153, the deviation ΔBzi of each magnetic field strength Bzi from its corresponding axially symmetric component BzO is calculated as follows:...In step 154, it is determined whether BzO and ΔBzi fall within the specified value...If not within the specified value (in the case of N), correction is made, in step 155, using the stage height control mechanism. (Nomura -- col. 16, lines 48-67).

Therefore, Nomura discloses applying a voltage to a stage height control mechanism that is responsive to a magnetic field strength generated by the magnetic lens. However, Nomura does not teach applying a current to the magnetic lens that is responsive to a control signal, where the control signal is responsive to an output signal that is responsive to a magnetic field strength generated by the magnetic lens.

As such, Nomura does not teach a method for controlling a magnetic field strength of a magnetic lens that includes applying a current to the magnetic lens that is responsive to a control signal, where the control signal is responsive to an output signal that is responsive to a magnetic field strength generated by the magnetic lens, as recited in claims 20 and 40. Therefore, Nomura does not teach all limitations of claims 20 and 40.

For at least the aforementioned reasons, claims 20 and 40 are not anticipated by the cited art. Accordingly, removal of the § 102 rejections of claims 20 and 40 is respectfully requested.

Section 103 Rejections:

Claims 1-14, 19, and 35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nomura. Claims 15-16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nomura in view of U.S. Patent No. 6,188,071 to Gordon et al. (hereinafter "Gordon"). Claims 1, 17, and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,172,364 to Yoshimoto et al. (hereinafter "Yoshimoto"). As will be set forth in more detail below, the §103(a) rejections of claims 1-19 and 35 are respectfully traversed.

To establish a *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP 2143.03. Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so. *In re Bond*, 910

F. 2d 81, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990). The cited art does not teach or suggest all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

The cited art does not teach or suggest an apparatus configured to control a magnetic field strength of a magnetic lens that includes a control circuit coupled to a magnetic sensor and the magnetic lens, which is configured to apply a current to the magnetic lens, where the current is responsive to a control signal, which is responsive to an output signal from the magnetic sensor. Independent claim 1 recites, in part:

> An apparatus configured to control a magnetic field strength of a magnetic lens during use, comprising:...a control circuit coupled to the magnetic sensor and the magnetic lens, wherein the control circuit is configured: to receive the output signal from the magnetic sensor during use;...to generate a control signal responsive to the output signal and the input signal during use; and to apply a current to the magnetic lens, wherein the current is responsive to the control signal.

Independent claim 35 recites similar limitations.

As set forth in more detail above, Nomura does not teach applying a current to a magnetic lens that is responsive to a control signal, where the control signal is responsive to an output signal that is responsive to a magnetic field strength generated by the magnetic lens. Therefore, Nomura cannot teach or suggest a control circuit that is configured to apply a current to a magnetic lens, where the current is responsive to a control signal, which is responsive to an output signal from a magnetic sensor. Consequently, Nomura does not teach or suggest an apparatus configured to control a magnetic field strength of a magnetic lens that includes a control circuit coupled to a magnetic sensor and the magnetic lens, which is configured to apply a current to the magnetic lens, where the current is responsive to a control signal, which is responsive to an output signal from the magnetic sensor, as recited in claims 1 and 35.

In addition, Nomura cannot be combined with Gordon and/or Yoshimoto to overcome the deficiencies therein. For example, Gordon discloses a feedback method for increasing stability of electron beams. Gordon states that "Temperature dependency on magnetic field strength of an electron optical element in an electron beam system due to variation of permeability with temperature of a ferromagnetic pole piece subject to radiant heating from another electron optical element is corrected by measurement of pole piece temperature and closed loop control of excitation current of a correction element." (Gordon –

Abstract, lines 1-7.) Therefore, Gordon teaches applying a current to a magnetic lens, which is responsive to an output signal from a temperature sensor. However, Gordon does not teach or suggest an apparatus configured to control a magnetic field strength of a magnetic lens that includes a control circuit coupled to a magnetic sensor and the magnetic lens, which is configured to apply a current to the magnetic lens, where the current is responsive to a control signal, which is responsive to an output signal from the magnetic sensor, as recited in claims 1 and 35. Consequently, Gordon does not teach all limitations of claims 1 and 35 and cannot be combined with Nomura to overcome deficiencies therein.

Yoshimoto discloses a magneto-optical recording apparatus with controlled magnetic field generation. For example, Yoshimoto states that "Data detected by the magnetic field sensor 23 is fed back to the current driver 24 to control current applied to the auxiliary magnet 21." (Yoshimoto – col. 11, lines 30-32.) The Office Action states that "Yoshimoto [364] does not explicitly state that the magnetic field generating means is a magnetic lens. It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the magnetic field generating means of Yoshimoto [364] with a magnetic lens as a matter of design choice." (Office Action -- page 9). Applicant respectfully disagrees with this assertion.

First of all, as set forth in the Specification, "As used herein, a 'magnetic lens' is generally defined as a magnetic circuit configured to apply a magnetic field to a charged particle beam." (Specification -- page 18, lines 13-14.) However, the magnetic field generators of Yoshimoto do not apply a magnetic field to a charged particle beam. Instead, the magnetic field generators of Yoshimoto apply a magnetic field to a magneto-optic recording information medium. Therefore, the magnetic field generators of Yoshimoto are not equivalent structurally or functionally to magnetic lenses as defined in the present application.

In addition, Yoshimoto states that "The first embodiment of the invention is a magneto-optic recording apparatus which includes a magnetic field generator which applies a magnetic field with a constant direction to the magneto-optic recording information medium to overwrite information thereon." (Yoshimoto -- col. 8, lines 11-15.) As shown in Fig. 9 of Yoshimoto, magnetic field generators 18 and 21 are spaced from magneto-optic recording information medium 11. Therefore, magnetic field generators must generate an external magnetic field in order to apply a magnetic field to the recording medium. In contrast, as is known to one of ordinary skill in the art (see, for example, Nomura) magnetic lenses generate a magnetic field that is internal to the magnetic lenses. Therefore, the magnetic field generators of Yoshimoto are structurally and functionally different than magnetic lenses. Consequently, it would not

be obvious to one of ordinary skill in the art at the time the invention was made to replace the magnetic field generating means of Yoshimoto with a magnetic lens, particularly not as a matter of design choice.

Moreover, the magnetic field generators of Yoshimoto cannot be replaced with magnetic lenses since magnetic lenses can apply a magnetic field to a charged particle beam but not a magneto-optic recording information medium. For instance, Yoshimoto states that "it is a principal object of the invention to provide a magneto-optic recording apparatus which improves the accuracy of information recording and reproducing to and from a magneto-optic recording information medium." (Yoshimoto – col. 8, lines 6-10.) However, the magneto-optic recording apparatus will not be operable unless the magnetic field generators are configured to apply a magnetic field to the magneto-optic recording information medium. Consequently, replacing the magnetic field generators of Yoshimoto with magnetic lenses would render the apparatus of Yoshimoto unsatisfactory for its intended purpose. If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). MPEP 2143.01. As a result, there is no suggestion or motivation to modify Yoshimoto as suggested in the Office Action.

Additionally, replacing the magnetic field generators of Yoshimoto with magnetic lenses would change the principle of operation of the prior art invention of Yoshimoto. In particular, the apparatus of Yoshimoto would be non-functional since a magnetic field could not be applied to a recording medium by a magnetic lens. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). MPEP 2143.01. Therefore, the teachings of Yoshimoto are not sufficient to render the claims *prima facie* obvious.

Furthermore, since the magnetic field generators of Yoshimoto differ significantly in structure and operation from magnetic lenses (see, for example, the magnetic lens of Nomura), and since replacing the magnetic field generators of Yoshimoto with magnetic lenses would render the apparatus of Yoshimoto non-functional, there can no reasonable expectation of success that the magnetic field generators of Yoshimoto could be replaced with magnetic lenses. The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). MPEP 2143.02. Consequently, Yoshimoto cannot

be modified as suggested in the Office Action to reject the present claims as *prima facie* obvious since there is no reasonable expectation of success.

In addition, even if the magnetic field generators of Yoshimoto could be replaced with magnetic lenses, Yoshimoto does not suggest the desirability of using magnetic lenses in place of the magnetic field generators. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). MPEP 2143.01. Therefore, the modifications to Yoshimoto suggested in the Office Action are not obvious because the prior art does not suggest the desirability of the suggested modifications.

For at least the reasons set forth above, Yoshimoto does not teach or suggest an apparatus configured to control a magnetic field strength of a magnetic lens that includes a control circuit coupled to a magnetic sensor and the magnetic lens, which is configured to apply a current to the magnetic lens, where the current is responsive to a control signal, which is responsive to an output signal from the magnetic sensor, as recited in claims 1 and 35. Consequently, Yoshimoto does not teach all limitations of claims 1 and 35 and cannot be combined with Nomura and/or Gordon to overcome deficiencies therein.

Therefore, none of the cited art, either individually or in any combination thereof, teaches or suggests an apparatus configured to control a magnetic field strength of a magnetic lens that includes a control circuit coupled to a magnetic sensor and the magnetic lens, which is configured to apply a current to the magnetic lens, where the current is responsive to a control signal, which is responsive to an output signal from the magnetic sensor, as recited in claims 1 and 35. Consequently, the cited art does not teach or suggest all limitations of claims 1 and 35.

For at least the reasons stated above, claims 1 and 35 are patentably distinct over the cited art. Therefore, claims 2-19, which depend from claim 1, are also patentably distinct over the cited art for at least the same reasons. Accordingly, removal of the § 103(a) rejections of claims 1-19 and 35 is respectfully requested.

CONCLUSION

This response constitutes a complete response to all issues raised in the Office Action mailed October 9, 2003. In addition, the art cited but not relied upon is not believed to be pertinent to the patentability of the present claims. In view of the remarks traversing rejections presented therein, Applicants assert that pending claims 1-20, 35, and 40 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned earnestly requests a telephone conference.

The Commissioner is authorized to charge any required fees or credit any overpayment to Conley Rose, P.C. Deposit Account No. 03-2769/5589-00301.

Respectfully submitted,

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